

FCC TEST REPORT

FOR

Nomenta Industries International BV

Bluetooth Speaker

TEST Model No.: Synergy 65 PRO

| | |
|--------------------------------|---|
| Prepared for | : Nomenta Industries International BV |
| Address | : Kenaupark 33-2, 2011 MR, Haarlem, The Netherlands |
| Prepared by | : Shenzhen LCS Compliance Testing Laboratory Ltd |
| Address | : 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China |
| Tel | : (+86)755-82591330 |
| Fax | : (+86)755-82591332 |
| Web | : www.LCS-cert.com |
| Mail | : webmaster@LCS-cert.com |
| Date of receipt of test sample | : January 10, 2019 |
| Number of tested samples | : 1 |
| Sample number | : Prototype |
| Date of Test | : January 10, 2019 ~ January 16, 2019 |
| Date of Report | : January 22, 2019 |

FCC TEST REPORT
FCC CFR 47 PART 15 C (15.249)

Report Reference No. : **LCS190104060AEB**

Date of Issue..... : January 22, 2019

Testing Laboratory Name..... : **Shenzhen LCS Compliance Testing Laboratory Ltd.**

Address..... : 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue,
Bao'an District, Shenzhen, Guangdong, China

Testing Location/ Procedure : Full application of Harmonised standards ■
Partial application of Harmonised standards □
Other standard testing method □

Applicant's Name : **Nomenta Industries International BV**

Address..... : Kenaupark 33-2, 2011 MR, Haarlem, The Netherlands

Test Specification

Standard : FCC CFR 47 PART 15 C(15.249) / ANSI C63.10: 2013

Test Report Form No...... : LCSEMC-1.0


TRF Originator..... : Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF..... : Dated 2011-03

Shenzhen LCS Compliance Testing Laboratory Ltd. All rights reserved.

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen LCS Compliance Testing Laboratory Ltd. is acknowledged as copyright owner and source of the material. Shenzhen LCS Compliance Testing Laboratory Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Test Item Description..... : Bluetooth Speaker

Trade Mark : 

Test Model..... : Synergy 65 PRO

Ratings..... : DC7.4V by Rechargeable Li-ion Battery(3000mAh)
Maximum Charging Voltage: DC5V

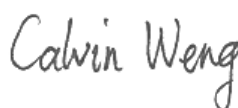
Result : **Positive**

Compiled by:



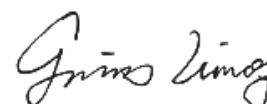
Ryan Hu/ Administrators

Supervised by:



Calvin Weng/Technique principal

Approved by:



Gavin Liang/ Manager

FCC -- TEST REPORT

| | | |
|--------------------------|------------------------|--|
| Test Report No. : | LCS190104060AEB | <u>January 22, 2019</u> Date of issue |
|--------------------------|------------------------|--|

Test Model..... : Synergy 65 PRO

EUT..... : Bluetooth Speaker

Applicant..... : Nomenta Industries International BV

Address..... : Kenaupark 33-2, 2011 MR, Haarlem, The Netherlands

Telephone..... : /

Fax..... : /

Manufacturer..... : Shenzhen Komkia Technology LTD

Address..... : Kenaupark 33-2, 2011 MR, Haarlem, The Netherlands

Telephone..... : /

Fax..... : /

Factory..... : /

Address..... : /

Telephone..... : /

Fax..... : /

| | |
|--------------------|-----------------|
| Test Result | Positive |
|--------------------|-----------------|

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

| Revision | Issue Date | Revisions | Revised By |
|----------|------------------|---------------|-------------|
| 000 | January 22, 2019 | Initial Issue | Gavin Liang |
| | | | |
| | | | |

TABLE OF CONTENTS

| | |
|--|-----------|
| 1. GENERAL INFORMATION | 6 |
| 1.1 Description of Device (EUT) | 6 |
| 1.2 Support equipment List | 6 |
| 1.3 External I/O Cable | 6 |
| 1.4 Description of Test Facility | 7 |
| 1.5 Statement of the Measurement Uncertainty | 7 |
| 1.6 Measurement Uncertainty | 7 |
| 1.7 Description of Test Modes | 8 |
| 1.8 Channel List and Frequency | 8 |
| 2. TEST METHODOLOGY | 9 |
| 2.1 EUT Configuration | 9 |
| 2.2 EUT Exercise | 9 |
| 2.3 General Test Procedures | 9 |
| 2.3.1 Conducted Emissions | 9 |
| 2.3.2 Radiated Emissions | 9 |
| 3. SYSTEM TEST CONFIGURATION | 10 |
| 3.1 Justification | 10 |
| 3.2 EUT Exercise Software | 10 |
| 3.3. Special Accessories | 10 |
| 3.4 Block Diagram/Schematics | 10 |
| 3.5 Equipment Modifications | 10 |
| 3.6 Test Setup | 10 |
| 4. SUMMARY OF TEST RESULT | 11 |
| 5. SUMMARY OF TEST EQUIPMENT | 12 |
| 6. ANTENNA REQUIREMENT | 13 |
| 6.1. Standard Applicable | 13 |
| 6.2. Antenna Connected Construction | 13 |
| 6.3. Result: Compliance | 13 |
| 7. RADIATED EMISSION MEASUREMENT | 14 |
| 7.1. Standard Applicable | 14 |
| 7.2. Instruments Setting | 14 |
| 7.3. Test Procedure | 15 |
| 7.4. Block Diagram of Test Setup | 19 |
| 7.5. Test Results | 20 |
| 8. 99% AND 20DB BANDWIDTH MEASUREMENT | 23 |
| 8.1. Standard Applicable | 23 |
| 8.2. Block Diagram of Test Setup | 23 |
| 8.3. Test Procedure | 23 |
| 8.4. Test Results | 23 |
| 9. AC POWER LINE CONDUCTED EMISSIONS | 25 |
| 9.1 Standard Applicable | 25 |
| 9.2 Block Diagram of Test Setup | 25 |
| 9.3 Test Results | 25 |
| 10. TEST SETUP PHOTOGRAPHS | 27 |
| 11. EXTERIOR PHOTOGRAPHS OF THE EUT | 27 |
| 12. INTERIOR PHOTOGRAPHS OF THE EUT | 27 |

1. GENERAL INFORMATION

1.1 Description of Device (EUT)

| | | |
|-------------------------------|---|--|
| EUT | : | Bluetooth Speaker |
| Test Model | : | Synergy 65 PRO |
| Power Supply | : | DC7.4V by Rechargeable Li-ion Battery(3000mAh) Maximum Charging Voltage: DC5V |
| Hardware Version | : | V1.0 |
| Software Version | : | V1.0 |
| Bluetooth | : | |
| Bluetooth Operation frequency | : | 2402MHz-2480MHz |
| Bluetooth Version | : | V4.2 |
| Bluetooth Channel Number | : | 79 Channels for Bluetooth V4.2 (BT Classics) |
| Bluetooth Channel Spacing | : | 1MHz for Bluetooth V4.2(BT Classics) |
| Bluetooth Modulation Type | : | GFSK, $\pi/4$ -DQPSK, 8-DPSK for Bluetooth V4.2 (BT Classics) |
| Antenna Description | : | Internal Antenna, 2.88dBi (Max.) |
| 5.8G | : | |
| Frequency Range | : | 5763MHz |
| Channel Number | : | 1 channels |
| Modulation Type | : | GFSK |
| Antenna Description | : | Internal Antenna, 0.5dBi (max.) |

1.2 Support equipment List

| Manufacturer | Description | Model | Serial Number | Certificate |
|--------------|-------------|-------|---------------|-------------|
| -- | -- | -- | -- | -- |

1.3 External I/O Cable

| I/O Port Description | Quantity | Cable |
|----------------------|----------|-------|
| Micro USB Port | 1 | N/A |

1.4 Description of Test Facility

FCC Registration Number. is 254912.

Industry Canada Registration Number. is 9642A-1.

ESMD Registration Number. is ARCB0108.

UL Registration Number. is 100571-492.

TUV SUD Registration Number. is SCN1081.

TUV RH Registration Number. is UA 50296516-001

NVLAP Registration Code is 600167-0

NVLAP designation number is CN5024

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

1.5 Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

1.6 Measurement Uncertainty

| Test Item | Frequency Range | Uncertainty | Note |
|--------------------------|-----------------|-------------|------|
| Radiation Uncertainty : | 9KHz~30MHz | 3.10dB | (1) |
| | 30MHz~200MHz | 2.96dB | (1) |
| | 200MHz~1000MHz | 3.10dB | (1) |
| | 1GHz~26.5GHz | 3.80dB | (1) |
| | 26.5GHz~40GHz | 3.90dB | (1) |
| Conduction Uncertainty : | 150kHz~30MHz | 1.63dB | (1) |
| Power disturbance : | 30MHz~300MHz | 1.60dB | (1) |

(1). This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.7 Description of Test Modes

The EUT operates in the unlicensed ISM band at 5.8GHz. The following operating modes were applied for the related test items.

All test modes were tested, only the result of the worst case was recorded in the report.

The EUT is considered a portable unit and was set to transmit at 100% duty cycle. It was pre-tested on the positioned of each 3 axis. The worst case was found positioned on X-plane.

| Mode of operations | Transmitting frequency (MHz) |
|------------------------|------------------------------|
| | 5763 |
| For Conducted Emission | |
| Test Mode | TX Mode |
| For Radiated Emission | |
| Test Mode | TX Mode |

***Note: Using a temporary antenna connector for the EUT when the conducted measurements are performed.

1.8 Channel List and Frequency

| Test Mode | Channel | Frequency Range (MHz) |
|-----------|---------|-----------------------|
| TX | 1 | 5763 |
| Standby | -- | -- |

2. TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.10: 2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

The radiated testing was performed at an antenna-to-EUT distance of 3 meters. All radiated and conducted emissions measurement was performed at Shenzhen LCS Compliance Testing Laboratory Ltd.

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.205, 15.207, 15.209 and 15.249 under the FCC Rules Part 15 Subpart C.

2.3 General Test Procedures

2.3.1 Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in ANSI C63.10 for Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

2.3.2 Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in ANSI C63.10 for radiated emission.

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a continuous transmit condition. Continuous transmitting.

The EUT After the power is switched on, the hand is placed over the microwave module, and the continuous transmit signal.

3.2 EUT Exercise Software

N/A.

3.3. Special Accessories

N/A.

3.4 Block Diagram/Schematics

Please refer to the related document.

3.5 Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

3.6 Test Setup

Please refer to the test setup photo.

4. SUMMARY OF TEST RESULT

| FCC Rules | Description Of Test | Result |
|---|--------------------------------|-----------|
| §15.203 | Antenna Requirement | Compliant |
| §15.207(a) | Power Line Conducted Emissions | Compliant |
| §15.205(a), §15.209(a), §15.249(a), §15.249(c) | Radiated Emissions Measurement | Compliant |
| §15.205 | Band Edges Measurement | Compliant |
| §15.249, §15.215 | 99% and 20dB Bandwidth | Compliant |

5. SUMMARY OF TEST EQUIPMENT

| Item | Equipment | Manufacturer | Model No. | Serial No. | Cal Date | Due Date |
|------|--------------------------------|--------------------|--------------|-----------------|------------|------------|
| 1 | MXA Signal Analyzer | Agilent | N9020A | MY49100060 | 2018-11-15 | 2019-11-14 |
| 2 | DC Power Supply | Agilent | E3642A | N/A | 2018-11-15 | 2019-11-14 |
| 3 | Temperature & Humidity Chamber | GUANGZHOU GOGN WEN | GDS-100 | 70932 | 2018-10-10 | 2019-10-09 |
| 4 | EMI Test Software | AUDIX | E3 | / | / | / |
| 5 | 3m Semi Anechoic Chamber | SIDT FRANKONIA | SAC-3M | 03CH03-HY | 2018-06-16 | 2019-06-15 |
| 6 | Positioning Controller | MF | MF-7082 | / | 2018-06-16 | 2019-06-15 |
| 7 | Active Loop Antenna | SCHWARZBECK | FMZB 1519B | 00005 | 2018-07-26 | 2019-07-25 |
| 8 | By-log Antenna | SCHWARZBECK | VULB9163 | 9163-470 | 2018-07-26 | 2019-07-25 |
| 9 | Horn Antenna | SCHWARZBECK | BBHA 9120D | 9120D-1925 | 2018-07-02 | 2019-07-01 |
| 10 | EMI Test Receiver | R&S | ESR 7 | 101181 | 2018-06-16 | 2019-06-15 |
| 11 | RS SPECTRUM ANALYZER | R&S | FSP40 | 100503 | 2018-11-15 | 2019-11-14 |
| 12 | AMPLIFIER | QuieTek | QTK | CHM/0809065 | 2018-11-15 | 2019-11-14 |
| 13 | RF Cable-R03m | Jye Bao | RG142 | CB021 | 2018-06-16 | 2019-06-15 |
| 14 | RF Cable-HIGH | SUHNER | SUCOFLEX 106 | 03CH03-HY | 2018-06-16 | 2019-06-15 |
| 15 | EMI Test Receiver | R&S | ESPI | 101840 | 2018-06-16 | 2019-06-15 |
| 16 | Artificial Mains | R&S | ENV216 | 101288 | 2018-06-16 | 2019-06-15 |
| 17 | 10dB Attenuator | SCHWARZBECK | MTS-IMP-136 | 261115-001-0032 | 2018-06-16 | 2019-06-15 |

Note: All equipment is calibrated through GUANGZHOU LISAI CALIBRATION AND TEST CO.,LTD.

6. ANTENNA REQUIREMENT

6.1. Standard Applicable

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

6.2. Antenna Connected Construction

The directional gains of antenna used for transmitting is 0.5dBi, and the antenna is connect to PCB board and no consideration of replacement, meet FCC §15.203 antenna requirement.

6.3. Result: Compliance.

7. RADIATED EMISSION MEASUREMENT

7.1. Standard Applicable

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) and 15.249 limit in the table below has to be followed.

| Fundamental Frequency | Field Strength of fundamental (millivolts/meter) | Field Strength of harmonics (microvolts/meter) |
|-----------------------|---|---|
| 902-928 MHz | 50 | 500 |
| 2400-2483.5 MHz | 50 | 500 |
| 5725-5875 MHz | 50 | 500 |
| 24.0-24.25 GHz | 250 | 2500 |

| Frequencies (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|----------------------|--------------------------------------|----------------------------------|
| 0.009~0.490 | 2400/F(KHz) | 300 |
| 0.490~1.705 | 24000/F(KHz) | 30 |
| 1.705~30.0 | 30 | 30 |
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |
| Above 960 | 500 | 3 |

7.2. Instruments Setting

Please refer to equipment list in this report. The following table is the setting of spectrum analyzer and receiver.

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start Frequency | 1000 MHz |
| Stop Frequency | 10 th carrier harmonic |
| RB / VB (Emission in restricted band) | 1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average |
| RB / VB (Emission in non-restricted band) | 1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average |

| Receiver Parameter | Setting |
|------------------------|--|
| Attenuation | Auto |
| Start ~ Stop Frequency | 9kHz~150kHz / RB/VB 200Hz/1KHz for QP/AVG |
| Start ~ Stop Frequency | 150kHz~30MHz / RB/VB 9kHz/30KHz for QP/AVG |
| Start ~ Stop Frequency | 30MHz~1000MHz / RB/VB 120kHz/1MHz for QP |

7.3. Test Procedure

1) Sequence of testing 9 kHz to 30 MHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
- If the EUT is a floor standing device, it is placed on the ground.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

Premeasurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna height is 0.8 meter.
- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).
- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

Premeasurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 to 3 meter.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ($\pm 45^\circ$) and antenna movement between 1 and 4 meter.
- The final measurement will be done with QP detector with an EMI receiver.
- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1 GHz to 18 GHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

Premeasurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height scan range is 1 meter to 2.5 meter.
- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ($\pm 45^\circ$) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.
- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

4) Sequence of testing above 18 GHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 1 meter.
- The EUT was set into operation.

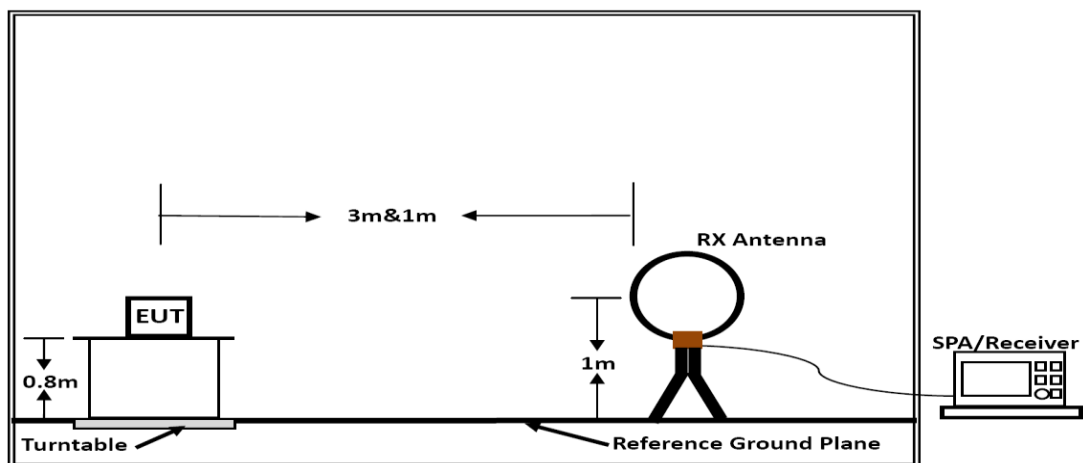
Premeasurement:

- The antenna is moved spherical over the EUT in different polarizations of the antenna.

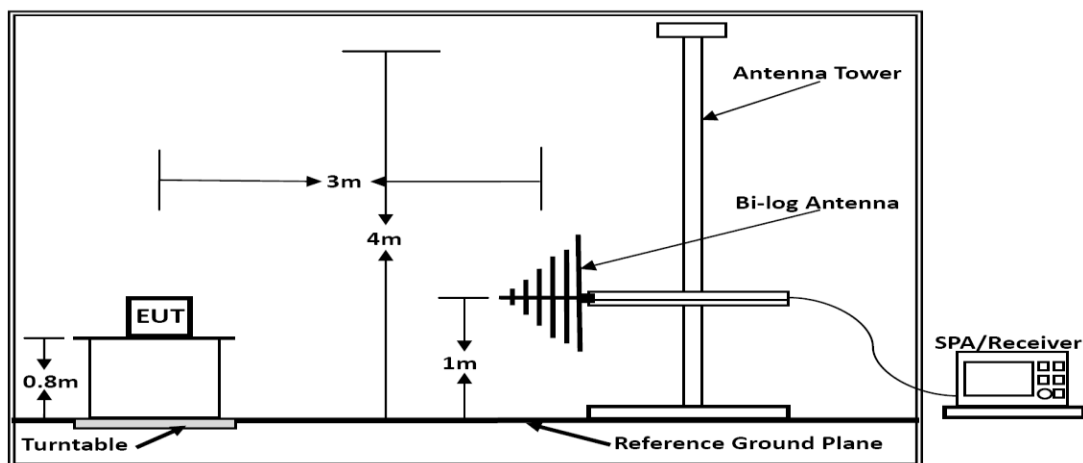
Final measurement:

- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

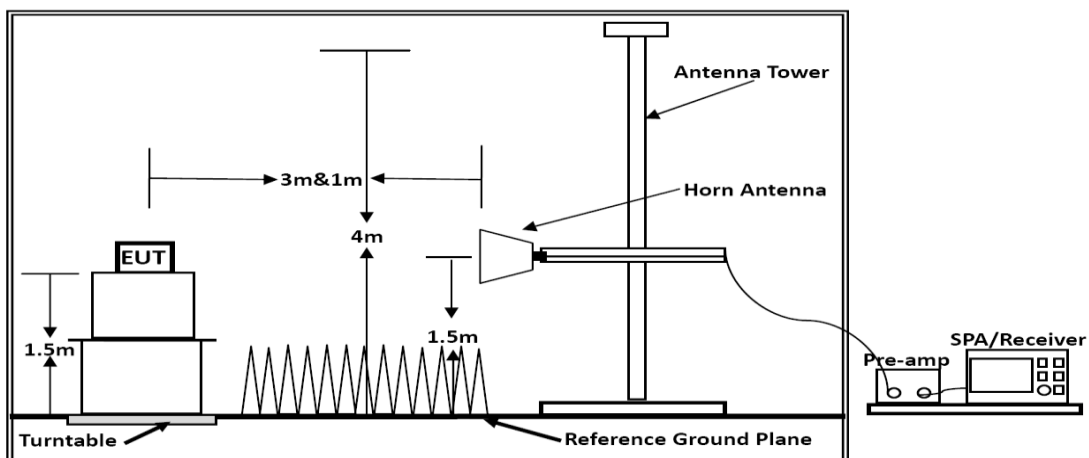
7.4. Block Diagram of Test Setup



Below 30MHz



Below 1GHz



Above 1GHz

7.5. Test Results

Results of Radiated Emissions (9 KHz – 30 MHz)

| Frequency (MHz) | Level (dBuV) | Over Limit (dB) | Over Limit (dBuV) | Remark |
|-----------------|--------------|-----------------|-------------------|----------|
| - | - | - | - | See Note |

Note:

The radiated emissions from 9 KHz to 30 MHz are at least 20dB below the official limit and no need to report.

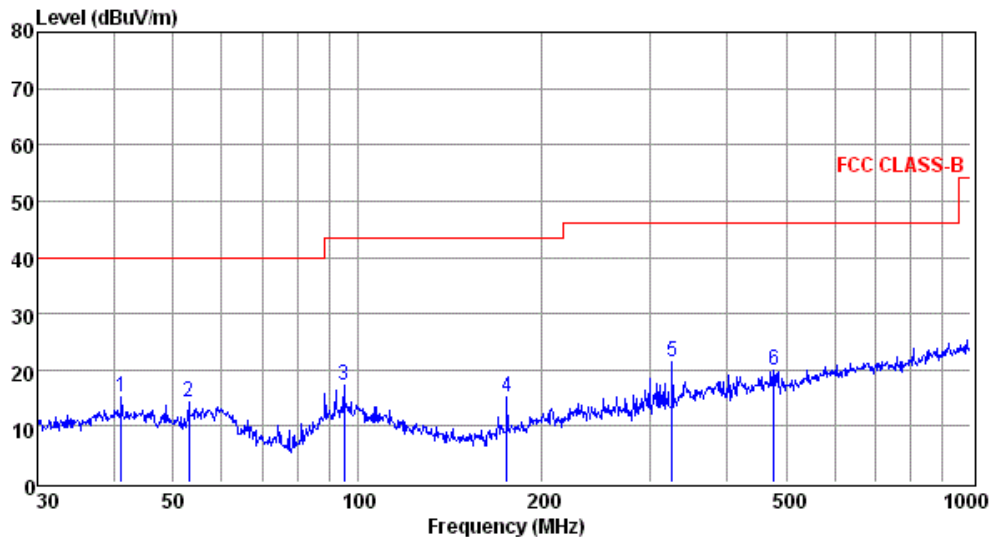
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

Results of Radiated Emissions (30 MHz – 1000 MHz)

| | | | |
|---------------|-----------|-----------|-------|
| Temperature | 22.9℃ | Humidity | 52.8% |
| Test Engineer | David Luo | Test Mode | TX |

Vertical



Env./Ins: 22.9℃/52.8%
pol: VERTICAL

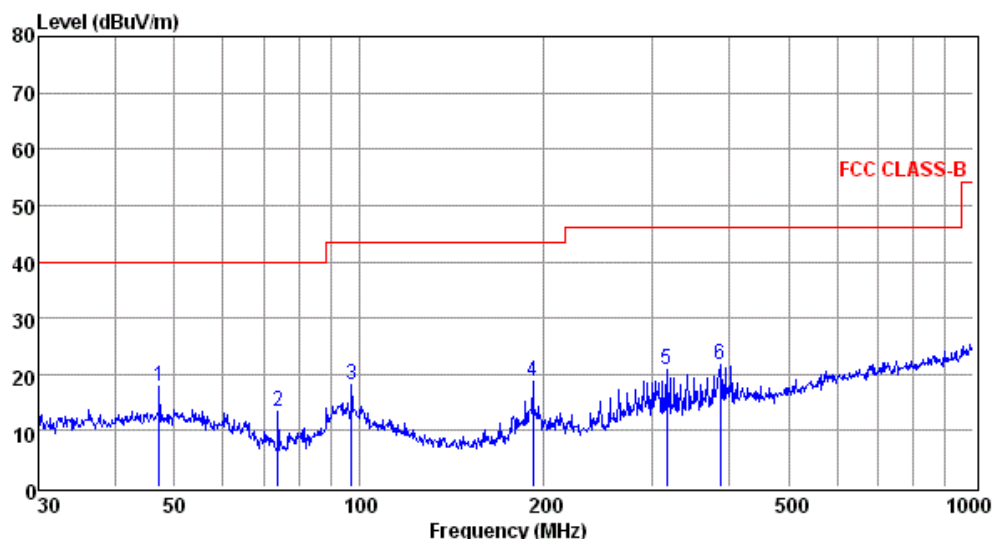
| | Freq | Reading | CabLos | Antfac | Measured | Limit | Over | Remark |
|---|--------|---------|--------|--------|----------|--------|--------|--------|
| | MHz | dBuV | dB | dB/m | dBuV/m | dBuV/m | dB | |
| 1 | 41.13 | 1.03 | 0.50 | 13.57 | 15.10 | 40.00 | -24.90 | QP |
| 2 | 52.95 | 0.67 | 0.46 | 13.11 | 14.24 | 40.00 | -25.76 | QP |
| 3 | 95.09 | 3.84 | 0.58 | 12.85 | 17.27 | 43.50 | -26.23 | QP |
| 4 | 175.04 | 5.19 | 0.73 | 9.33 | 15.25 | 43.50 | -28.25 | QP |
| 5 | 325.60 | 6.71 | 1.04 | 13.55 | 21.30 | 46.00 | -24.70 | QP |
| 6 | 477.17 | 2.41 | 1.39 | 16.00 | 19.80 | 46.00 | -26.20 | QP |

Note: 1. All readings are Quasi-peak values.

2. Measured= Reading + Antenna Factor + Cable Loss

3. The emission that are 20db below the official limit are not reported

Horizontal



Env./Ins: 22.9°C/52.8%
 pol: HORIZONTAL

| | Freq | Reading | CabLos | Antfac | Measured | Limit | Over | Remark |
|---|--------|---------|--------|--------|----------|--------|--------|--------|
| | MHz | dBuV | dB | dB/m | dBuV/m | dBuV/m | dB | |
| 1 | 47.16 | 4.04 | 0.35 | 13.42 | 17.81 | 40.00 | -22.19 | QP |
| 2 | 73.62 | 4.70 | 0.54 | 8.04 | 13.28 | 40.00 | -26.72 | QP |
| 3 | 97.11 | 4.66 | 0.61 | 12.98 | 18.25 | 43.50 | -25.25 | QP |
| 4 | 191.75 | 7.36 | 0.86 | 10.56 | 18.78 | 43.50 | -24.72 | QP |
| 5 | 316.59 | 6.42 | 1.09 | 13.28 | 20.79 | 46.00 | -25.21 | QP |
| 6 | 386.63 | 5.59 | 1.32 | 14.75 | 21.66 | 46.00 | -24.34 | QP |

Note: 1. All readings are Quasi-peak values.
 2. Measured= Reading + Antenna Factor + Cable Loss
 3. The emission that are 20db below the official limit are not reported

Note:

- 1). Pre-scan all modes and recorded the worst case results in this report.
- 2). Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 3). Corrected Reading: Antenna Factor + Cable Loss + Read Level = Level.

Results for Radiated Emissions (Above 1GHz)

| Field Strength of Fundamental (TX-5763MHz) | | | | | | |
|--|------|-----------------------------|------------------------------|---------------------|--------------------|--------|
| Frequency (MHz) | Pol. | Measure Result (PK, dBuV/m) | Measure Result (AVG, dBuV/m) | Peak Limit (dBuV/m) | AVG Limit (dBuV/m) | Result |
| 5763.00 | H | 87.76 | 75.52 | 114.00 | 94.00 | PASS |
| 5763.00 | V | 88.62 | 75.61 | 114.00 | 94.00 | PASS |

| Freq. MHz | Reading dBuV | Ant. Fac dB/m | Pre. Fac. dB | Cab. Loss dB | Measured dBuV/m | Limit dBuV/m | Margin dB | Remark | Pol. |
|-----------|--------------|---------------|--------------|--------------|-----------------|--------------|-----------|---------|------------|
| 11520 | 57.85 | 33.06 | 35.04 | 3.94 | 59.81 | 74.00 | -14.19 | Peak | Horizontal |
| 11520 | 40.81 | 33.06 | 35.04 | 3.94 | 42.77 | 54.00 | -11.23 | Average | Horizontal |
| 11520 | 52.72 | 33.06 | 35.04 | 3.94 | 54.68 | 74.00 | -19.32 | Peak | Vertical |
| 11520 | 39.62 | 33.06 | 35.04 | 3.94 | 41.58 | 54.00 | -12.42 | Average | Vertical |

Notes:

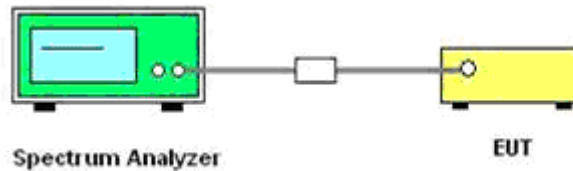
- 1). Measuring frequencies from 9 KHz - 10th harmonic (ex. 40GHz), No emission found between lowest internal used/generated frequency to 30 MHz.
- 2). Radiated emissions measured in frequency range from 9 KHz - 10th harmonic (ex. 40GHz) were made with an instrument using Peak detector mode.
- 3). 18~40GHz at least have 20dB margin. No recording in the test report.

8. 99% AND 20DB BANDWIDTH MEASUREMENT

8.1. Standard Applicable

No Limit

8.2. Block Diagram of Test Setup



8.3. Test Procedure

Use the following spectrum analyzer settings:

Span = 150 MHz

RBW = 100 KHz

VBW = 300 KHz

Sweep = auto

Detector function = peak

Trace = max hold

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

8.4. Test Results

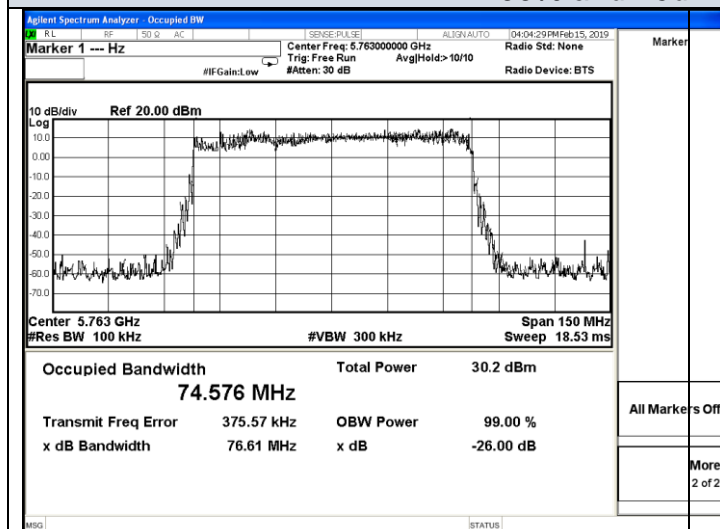
| Test Result of 99% and 20dB Bandwidth Measurement | | | | | |
|---|-----------------|---------------------------------|----------------------------------|--------------|---------|
| Test Mode | Frequency (MHz) | 99% Bandwidth Measurement (MHz) | 20dB Bandwidth Measurement (MHz) | Limits (MHz) | Verdict |
| No modulation | 5763 | 74.576 | 76.610 | / | PASS |

| Operating Frequency | | | | | |
|---------------------|-----------------|----------------------|----------------------|--------------|---------|
| Test Mode | Frequency (MHz) | f _L (MHz) | F _H (MHz) | Limits (MHz) | Verdict |
| No modulation | 5763 | >5725 | <5875 | 5725-5875 | PASS |

Remark:

1. Test results including cable loss;
2. Please refer to following plots;

99% and 20dB Bandwidth



5763 MHz

9. AC POWER LINE CONDUCTED EMISSIONS

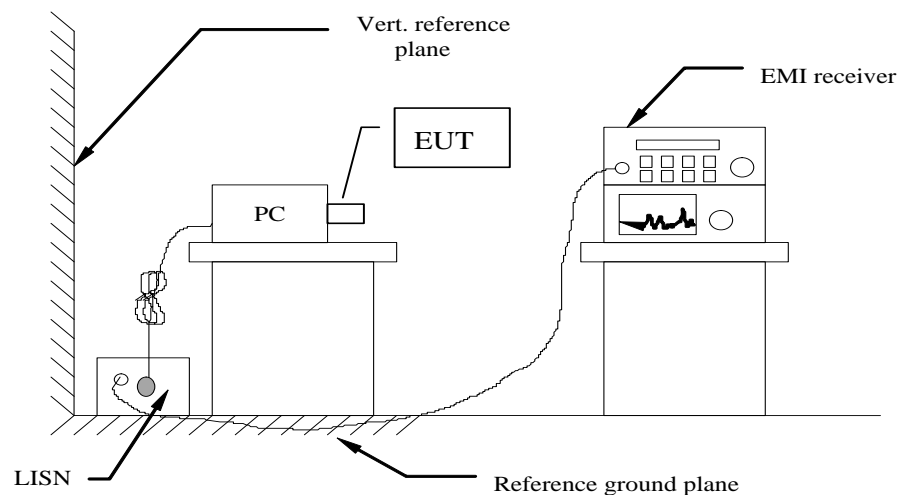
9.1 Standard Applicable

According to §15.207 (a): For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

| Frequency Range (MHz) | Limits (dB μ V) | |
|-----------------------|---------------------|----------|
| | Quasi-peak | Average |
| 0.15 to 0.50 | 66 to 56 | 56 to 46 |
| 0.50 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

* Decreasing linearly with the logarithm of the frequency

9.2 Block Diagram of Test Setup



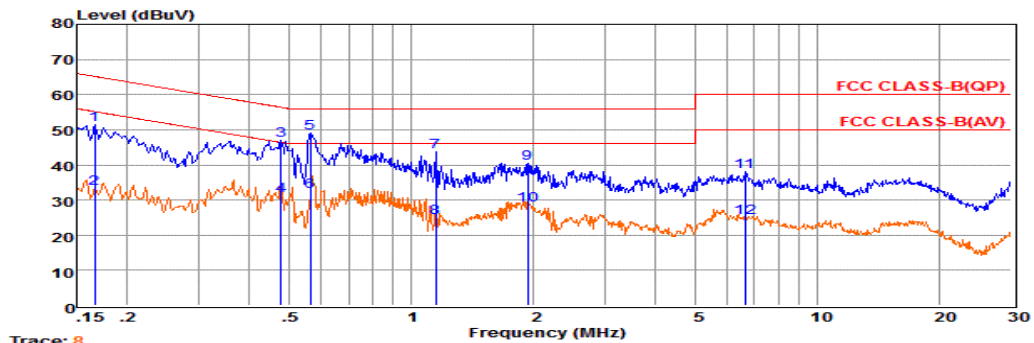
9.3 Test Results

PASS.

The test data please refer to following page.

AC Conducted Emission @ AC 120V/60Hz @ TX (worst case)

Line



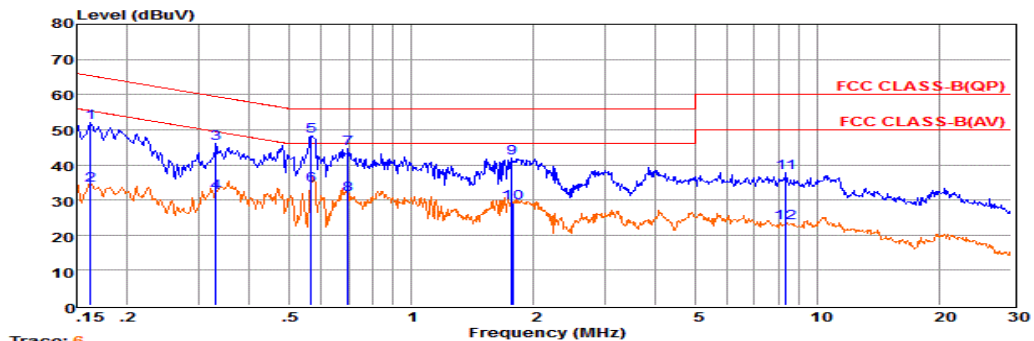
Trace: 8

Env. Ins: 23.5*/52.3%
Pol: LINE

| | Freq | Reading | LISNFac | CabLos | Aux2Fac | Measured | Limit | Over | Remark |
|----|------|---------|---------|--------|---------|----------|-------|--------|---------|
| | MHz | dBuV | dB | dB | dB | dBuV | dBuV | dB | |
| 1 | 0.17 | 31.82 | 9.59 | 0.02 | 10.00 | 51.43 | 65.16 | -13.73 | QP |
| 2 | 0.17 | 13.71 | 9.59 | 0.02 | 10.00 | 33.32 | 55.16 | -21.84 | Average |
| 3 | 0.48 | 27.24 | 9.62 | 0.04 | 10.00 | 46.90 | 56.36 | -9.46 | QP |
| 4 | 0.48 | 11.45 | 9.62 | 0.04 | 10.00 | 31.11 | 46.36 | -15.25 | Average |
| 5 | 0.56 | 29.44 | 9.63 | 0.04 | 10.00 | 49.11 | 56.00 | -6.89 | QP |
| 6 | 0.56 | 12.67 | 9.63 | 0.04 | 10.00 | 32.34 | 46.00 | -13.66 | Average |
| 7 | 1.15 | 24.11 | 9.63 | 0.05 | 10.00 | 43.79 | 56.00 | -12.21 | QP |
| 8 | 1.15 | 5.43 | 9.63 | 0.05 | 10.00 | 25.11 | 46.00 | -20.89 | Average |
| 9 | 1.94 | 20.86 | 9.64 | 0.05 | 10.00 | 40.55 | 56.00 | -15.45 | QP |
| 10 | 1.94 | 8.86 | 9.64 | 0.05 | 10.00 | 28.55 | 46.00 | -17.45 | Average |
| 11 | 6.63 | 18.37 | 9.68 | 0.07 | 10.00 | 38.12 | 60.00 | -21.88 | QP |
| 12 | 6.63 | 5.11 | 9.68 | 0.07 | 10.00 | 24.86 | 50.00 | -25.14 | Average |

Remarks: 1. Measured = Reading + LISNFac + Cable Loss + Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

Neutral



Trace: 6

Env. Ins: 23.5*/52.3%
Pol: NEUTRAL

| | Freq | Reading | LISNFac | CabLos | Aux2Fac | Measured | Limit | Over | Remark |
|----|------|---------|---------|--------|---------|----------|-------|--------|---------|
| | MHz | dBuV | dB | dB | dB | dBuV | dBuV | dB | |
| 1 | 0.16 | 32.50 | 9.67 | 0.02 | 10.00 | 52.19 | 65.34 | -13.15 | QP |
| 2 | 0.16 | 14.65 | 9.67 | 0.02 | 10.00 | 34.34 | 55.33 | -20.99 | Average |
| 3 | 0.33 | 26.55 | 9.61 | 0.03 | 10.00 | 46.19 | 59.44 | -13.25 | QP |
| 4 | 0.33 | 12.53 | 9.61 | 0.03 | 10.00 | 32.17 | 49.44 | -17.27 | Average |
| 5 | 0.57 | 28.54 | 9.62 | 0.04 | 10.00 | 48.20 | 56.00 | -7.80 | QP |
| 6 | 0.57 | 14.50 | 9.62 | 0.04 | 10.00 | 34.16 | 46.00 | -11.84 | Average |
| 7 | 0.70 | 24.90 | 9.63 | 0.04 | 10.00 | 44.57 | 56.00 | -11.43 | QP |
| 8 | 0.70 | 11.88 | 9.63 | 0.04 | 10.00 | 31.55 | 46.00 | -14.45 | Average |
| 9 | 1.77 | 22.38 | 9.63 | 0.05 | 10.00 | 42.06 | 56.00 | -13.94 | QP |
| 10 | 1.77 | 9.42 | 9.63 | 0.05 | 10.00 | 29.10 | 46.00 | -16.90 | Average |
| 11 | 8.37 | 18.12 | 9.71 | 0.07 | 10.00 | 37.90 | 60.00 | -22.10 | QP |
| 12 | 8.37 | 3.83 | 9.71 | 0.07 | 10.00 | 23.61 | 50.00 | -26.39 | Average |

Remarks: 1. Measured = Reading + LISNFac + Cable Loss + Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

***Note: Pre-scan all modes and recorded the worst case results in this report.

10. TEST SETUP PHOTOGRAPHS

Please refer to separated files for Test Setup Photos of the EUT.

11. EXTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for External Photos of the EUT.

12. INTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for Internal Photos of the EUT.

-----THE END OF REPORT-----